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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

AP
JFW

In Re Application of:

Frederick S.M. Herz, Lyle H. Ungar, Jason
M. Eisner, and Walter P. Labys

Application No.: 10/054,057

Filing Date: January 22, 2002

For: STOCK MARKET PREDICTION USING NATURAL LANGUAGE PROCESSING

Confirmation No.: 3878

Group Art Unit: 3624

Examiner: Debra F. Charles

DATE OF DEPOSIT: September 8, 2006

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MS Appeal Brief - Patent
Commissioner for Patents
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Alexandria, VA 22313-1450

**APPEAL BRIEF TRANSMITTAL
PURSUANT TO 37 CFR § 41.37**

Transmitted herewith in triplicate is the AMENDED APPEAL BRIEF in this application with respect to the Notification of Non-Compliant Appeal Brief (37 CFR 41.37) received by The United States Patent and Trademark Office on **August 8, 2006**.

Applicant(s) has previously claimed small entity status under 37 CFR § 41.37 .

Applicant(s) by its/their undersigned attorney, claims small entity status under 37 CFR § 1.27 as:

- an Independent Inventor
- a Small Business Concern
- a Nonprofit Organization.

Petition is hereby made under 37 CFR § 1.136(a) (fees: 37 CFR § 1.17(a)(1)-(4) to extend the time for response to the Office Action of to and through comprising an extension of the shortened statutory period of month(s).

	SMALL ENTITY		NOT SMALL ENTITY	
	RATE	Fee	RATE	Fee
<input type="checkbox"/> APPEAL BRIEF FEE	\$250	\$	\$500	\$
<input type="checkbox"/> ONE MONTH EXTENSION OF TIME	\$60	\$	\$120	\$
<input type="checkbox"/> TWO MONTH EXTENSION OF TIME	\$225	\$	\$450	\$
<input type="checkbox"/> THREE MONTH EXTENSION OF TIME	\$510	\$	\$1020	\$
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<input type="checkbox"/> FIVE MONTH EXTENSION OF TIME	\$1080	\$	\$2160	\$
<input type="checkbox"/> LESS ANY EXTENSION FEE ALREADY PAID	minus	(\$)	minus	(\$)
TOTAL FEE DUE		\$0		\$0

The Commissioner is hereby requested to grant an extension of time for the appropriate length of time, should one be necessary, in connection with this filing or any future filing submitted to the U.S. Patent and Trademark Office in the above-identified application during the pendency of this application. The Commissioner is further authorized to charge any fees related to any such extension of time to Deposit Account 23-3050. This sheet is provided in duplicate.

A check in the amount of \$.00 is attached. Please charge any deficiency or credit any overpayment to Deposit Account No. 23-3050.

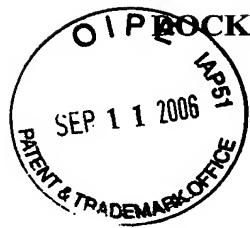
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Date: September 8, 2006


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In re Application of:

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Sir:

APPELLANT'S AMENDED BRIEF PURSUANT TO 37 C.F.R. § 41.37

In response to the Notice of Noncompliant Appeal Brief mailed August 8, 2006, this amended brief is being filed in support of Appellant's appeal from the rejection of claims 2-6 in the Final Rejection mailed September 21, 2005. A Notice of Appeal was filed on March 21, 2006.

1. REAL PARTY IN INTEREST

The real parties in interest are the respective inventors: Frederick S.M. Herz, Lyle H. Ungar, Jason M. Eisner, and Walter P. Labys. The invention is not assigned.

2. RELATED APPEALS AND INTERFERENCES

None.

3. STATUS OF CLAIMS

Claims 2-6 are rejected and are the subject of this appeal. Claim 2 is independent.

4. STATUS OF AMENDMENTS

No claim amendment has been proposed or entered subsequent to the Final Rejection. Applicant notes that the Examiner indicated in the Advisory Action mailed May 1, 2006, that Applicant's response filed February 21, 2006 "raised new issues" and would not be entered. However, Applicant notes that the response filed February 21, 2006, did not include any claim amendments. The argument that "new issues" were raised is clearly inappropriate and the arguments in the February 21, 2006, response should be included in the record on appeal.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The claimed subject matter relates to a method of predicting stock market behavior by using data mining techniques and natural language processing techniques to predict changes in the price of the stock of a particular company. The method includes relating changes in stock price of a particular publicly traded company to information about that particular publicly traded company as stored in a template (Figure 1; paragraphs [0008]-[0027]1, particularly examples in paragraphs [0021] and [0024]). The template information may include natural language text describing activities or announcements of the particular publicly traded company about that particular publicly traded company (Figure 1; paragraphs [0014], [0016]-[0018], [0025], [0029]). Data mining techniques correlate past changes in price of the stock of the particular publicly traded company to gathered information (paragraphs [0064], [0074] and [0077]). Then, if information of the type included in any new information has in the past caused a statistically significant change in the stock price in the particular publicly traded company, the direction of the value of the stock as a result of the impact of the new information may be predicted (Figure 2; paragraphs [0040]-[0054]). In this fashion, the claimed invention predicts the direction of the price of a particular stock as opposed to the

¹ All references to the specification are to the substitute specification.

direction of the stock market as a whole. Stock purchases may then be made based on the predicted direction of the stock price (Figure 3; paragraph [0056]).

As particularly set forth in claim 2, the invention relates to a method of predicting stock market behavior using natural language processing. The method includes the steps of extracting information from news media relating to a particular publicly traded company to create a template including natural language text describing activities or announcements of the particular publicly traded company (Figure 1; paragraphs [0008]-[0027], particularly examples in paragraphs [0021] and [0024]). The changes in stock price of the particular publicly traded company are related to information stored in the template about the particular publicly traded company (Figure 2; paragraphs [0028]-[0054]). A statistical significance of the changes in stock price of the particular publicly traded company is determined based on such information (paragraphs [0013], [0029]-[0030], [0037], [0073]-[0074], [0080], [0088], and [0090]), and changes in price of the stock of the particular publicly traded company are predicted based on new information about the particular publicly traded company if information of the type included in the new information has in the past caused a statistically significant change in the stock price in the particular publicly traded company (paragraphs [0028]-[0036]).

To increase the robustness of the data mining, the information for a particular company may be correlated with the information of other companies that are similarly affected by similar information, and the templates created for particular companies may also be accumulated into cluster groups [0030]. Such techniques are described, for example, in the substitute specification from paragraphs [0030] through [0057]. As particularly set forth in claim 4, for example, the information extracting step may include the steps of using natural language processing to parse sources of the information for information about the particular publicly traded company (Figure 1; paragraphs [0025], [0030], [0059] and [0073]), standardizing different references to the particular publicly traded company by different proper names (Figure 1; paragraph [0016]), co-referencing when the particular publicly traded company is referred to by pronouns (Figure 1; paragraph [0026]), and adding the new information to the template (Figure 1; paragraphs [0023]-[0024]) and additional information about the particular publicly traded company to the template using databases and/or derived values (Figure 1; paragraphs [0022]-[0023]).

As set forth in claim 5, the data may be made more robust by clustering templates containing information about different publicly traded companies into similar cluster groups

(Figure 2; paragraphs [0030]-[0033] and [0053]-[0055]) and determining changes in stock price at different intervals for different companies in a cluster group in response to comparable information (Figure 2; paragraphs [0030]-[0033] and [0053]-[0055]), and estimating the statistical probability of a change in the stock price of the particular publicly traded company in response to certain new information statistically correlated to that in the comparable information (Figure 2; paragraphs [0030], [0055], and [0059]).

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 2-6 stand finally rejected under 35 U.S.C. §103(a) as allegedly being obvious over an article by Wuthrich et al. entitled "Daily Stock Market Forecast from Textual Web Data" ("the Wuthrich article") in view of an article by Roesler et al. entitled "Intelligent Agents" ("the Roesler article"). This rejection is believed to be improper and is the subject of this appeal.

7. ARGUMENT

Withdrawal of the Final Rejection is requested for the following reasons:

The Wuthrich article in view of the Roesler article does not render obvious the subject matter of claims 2-6 since the Wuthrich article and the Roesler article together do not teach or suggest a method of predicting changes in the price of the stock of a particular publicly traded company by relating changes in stock price of the particular publicly traded company to information stored in a template including natural language text describing activities or announcements of the particular publicly traded company as claimed.

The entire rejection of the Examiner is set forth below:

Wurthrich (sic) et al. disclose the invention except interpreting the words as pronouns. Such an interpretation requires artificial intelligence and neural network technologies. However, in pages 26 and 28, Roesler et al. disclose using intelligent agents to locate items. It would be obvious to one of ordinary skill in the art to modify the invention of Wurthrich et al. based on the teachings of Roesler et al. The motivation to combine these references is to efficiently and effectively predict the stock market from news data.

Applicant submits that the rejection fails on its face to meet the minimum requirements of a *prima facie* case of obviousness and that, in any case, the teachings of the

cited articles are wholly inadequate to establish *prima facie* obviousness. Withdrawal of the final rejection is respectfully requested.

The Manual of Patent Examining Procedure (M.P.E.P.) specifies that to establish a *prima facie* case of obviousness, the Examiner must meet the initial burden of finding one or more prior art references that together provide some suggestion of the desirability of doing what the inventor has done. The references must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why one skilled in the art would have found the claimed invention to have been obvious at the time of the invention in view of the teachings of the references. M.P.E.P. §§ 2144 - 2144.09. In particular, after indicating a rejection under 35 U.S.C. §103, the examiner should set forth the following in the Office action:

1. the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate;
2. the difference or differences in the claim over the applied reference(s);
3. the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter; and
4. an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification. M.P.E.P. §706.02(j).

Applicant submits that the Examiner's rejection (copied above) is inadequate on all four of these points. The Examiner has not indicated which portions of the teachings of the Wuthrich article or the Roesler article she is relying upon in making the rejection, has provided no information explaining the relevance of the respective teachings of the references relied upon to the claimed invention, provided no information explaining how the teachings of one reference are used to modify the teachings of the other reference to arrive at the claimed invention, and provided no explanation as to why one of ordinary skill in the art would have been motivated to make the proposed modification. In short, the Examiner's rejection does not meet the minimum requirement of *prima facie* obviousness, irrespective of the teachings of the cited references.

As acknowledged in the M.P.E.P., it is important that the Office action explain the Examiner's rationale for decisions made during prosecution of the application since the Examiner cannot normally be compelled to appear in legal proceedings to explain his or her thought processes. M.P.E.P. §706.02(j). When the motivation to combine or modify the teachings of the prior art references is not immediately apparent, it is the examiner's duty to explain, with reasonable specificity, why the combination of the teachings is proper. *Ex parte Clapp*, 227 U.S.P.Q. 972 (Bd. Pat. App. & Inter. 1985); *Ex parte Levengood*, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993).

The Examiner clearly has not provided such a reasonably specific explanation in the present case and has thus failed to establish *prima facie* obviousness.

Furthermore, as set forth in M.P.E.P. §§2142-2143.03, in order to establish a *prima facie* case of obviousness, patent examiners are required to establish three criteria: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art reference, or combination of references, must teach or suggest all the claim limitations. The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. To make a proper obviousness determination, the examiner must "step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made." In view of the available factual information, the examiner must make a determination as to whether the claimed invention "as a whole" would have been obvious at that time to a person of ordinary skill in the art. Importantly, a rejection based on these criteria must be based on what is taught in the prior art, not the applicant's disclosure. The applicant's disclosure may not be used as a blueprint from which to construct an obviousness rejection.

The Examiner has not met her burden in the present case. The Examiner has not established that the Wuthrich article and the Roesler article together teach or suggest all the claim limitations and has not provided a suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or to combine the teachings of the Wuthrich and Roesler articles to arrive at the claimed invention. The shortcomings in the teachings of the Wuthrich and Roesler articles will be addressed below.

Independent Claim 2

Claim 2 recites a method of predicting stock market behavior using natural language processing, comprising:

extracting information from news media relating to a particular publicly traded company to create a template including natural language text describing activities or announcements of said particular publicly traded company;

relating changes in stock price of said particular publicly traded company to information stored in said template about said particular publicly traded company;

determining a statistical significance of said changes in stock price of said particular publicly traded company based on said information; and

predicting changes in price of the stock of said particular publicly traded company based on new information about said particular publicly traded company if information of the type included in the new information has in the past caused a statistically significant change in the stock price in said particular publicly traded company.

Applicant submits that the Examiner has not provided a suggestion or motivation to enable one skilled in the art to combine the teachings of the references as proposed by the Examiner and, in any case, the proposed combination of teachings does not teach or suggest at least the italicized claim limitations in claim 2 from which all claims depend. As evidenced by the italicized language in claim 2 above, the invention predicts changes in the price of the stock of a particular company by relating changes in stock price of the *particular publicly traded company* to information stored in a template including natural language text describing activities or announcements of the particular publicly traded company *about said particular publicly traded company*. Changes in price of the stock of the particular publicly traded company may be predicted based on new information about the particular publicly traded company if information of the type included in any new information has in the past caused a statistically significant change in the stock price in the particular publicly traded company. Thus, the gathered information is related to a *particular company* for which stock price predictions are to be made. Such methods are not taught in the Wuthrich or Roesler articles.

In contrast with the invention, the Wuthrich article describes a method of predicting the *daily closing values of major stock market indices* using information published in articles on the Internet - mostly textual articles appearing in the leading and influential financial newspapers. Keywords in the textual language, such as "bond strong," "dollar falter,"

"property weak," "dow rebound," "technology rebound strongly," etc. (bottom of column 2 of page 2721) are taken from the articles by a domain expert and weighted if determined to be influential factors that may potentially move the stock market indices. Such keyword data is not information "relating to a particular publicly traded company" and is not used to "create a template including natural language text describing activities or announcements of said particular publicly traded company" as claimed. The Wuthrich article does not teach how the keyword data is related to individual stocks and the described system makes no effort to predict the price of individual stocks using such keyword data. In fact, the system described in the Wuthrich article in no way relates the keyword data to the price of any individual stock and, in any case, it is unclear how such keyword data disclosed in the Wuthrich article could be related to the price of an individual stock as opposed to the stock index. Thus, even if the system described in the Wuthrich article could be modified to interpret pronouns as the Examiner suggests, the Wuthrich article does not generally teach how the resulting information could be related to the price of an individual stock as claimed and how a pronoun could be related to a particular stock as opposed to a stock index.

The Roesler article describes the use of intelligent agents for locating items within received textual content (pages 26 and 28). The Roesler article does not suggest that intelligent agents could be used to parse sources of information for information about a particular publicly traded company, to standardize different references to the particular publicly traded company by different proper names, or to co-reference when the particular publicly traded company is referred to by pronouns as set forth in claim 4, for example. In fact, the Roesler article also provides no teaching of co-referencing pronouns or of clustering data about different companies as claimed. Applicant does not see any particular relevance of the teachings of the Roesler article to the claimed invention and the Examiner has not provided any guidance. For example, the Roesler article does not address the above-noted shortcomings in the teachings of the Wuthrich article in that neither article suggests anything about relating keyword data to the price of an individual stock as claimed. Absent hindsight, there is no indication that the Roesler article would have been useful to one skilled in the art to provide such features in any system, much less the system described in the Wuthrich article.

In view of the afore-mentioned shortcomings in teachings of the Wuthrich and Roesler articles, Applicant submits that the Wuthrich and Roesler articles taken separately or together do not teach or suggest all of the claim limitations and hence cannot establish a

prima facie case of obviousness, even if the teachings of these references are combinable as proposed by the Examiner. To the extent the Examiner suggests to the contrary in the Final Rejection, Applicant respectfully disagrees. Withdrawal of the rejection of claims 2-6 as being obvious over the teachings of the Wuthrich and Roesler articles is respectfully solicited.

The Examiner has further failed to provide a *prima facie* case of obviousness with respect to any claim since the Examiner has not met her burden of providing a suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the reference teachings. Instead, the Examiner has provided general references to "efficiently and effectively predict the stock market from news data." Applicant submits that such general statements of motivation to combine made by the Examiner, without support in the references themselves or evidence that suggestions to combine are in the knowledge generally available to one skilled in the art, do not meet the Examiner's initial burden of factually supporting any *prima facie* conclusion of obviousness. Such a piecing together of disparate teachings, without sufficient motivations or suggestions to combine, suggest to Applicant that the Examiner has improperly used Applicant's disclosure as a blueprint for the obviousness rejection.

The Examiner further appears to suggest in the obviousness rejection that knowledge of artificial intelligence and/or neural networks is all that is necessary to lead one skilled in the art to combine the teachings of the Wuthrich and Roesler articles to provide the claimed methods, including pronoun co-referencing and the like. Such general suggestions clearly do not provide the requisite motivation to combine the teachings of these articles with the necessary expectation of success. Applicant submits that significantly more is required to establish *prima facie* obviousness. Moreover, as the requisite teachings of the claimed features are not provided in either article, the requisite teachings cannot be found in the combination in any case.

For the above reasons, withdrawal of the obviousness rejection and allowance of independent claim 2 are respectfully requested.

Dependent claims 3-6

Claim 3

Claim 3 further recites that the information about the particular publicly traded company whose stock price is being monitored may be clustered with information of another company whose stock price may be similarly affected by similar information that is included in the new information being analyzed. The Examiner has pointed to no teachings in the

Wuthrich article or the Roesler article relevant to such clustering, and Applicant can find none. Withdrawal of the rejection as applied to claim 3 is solicited.

Claim 4

Claim 4 further recites that natural language processing is used to parse a source of information for information about the particular publicly traded company and that the references to the publicly traded company are standardized, co-referenced to pronouns, and added to the template for the company. The Examiner has suggested that knowledge of artificial intelligence and neural networks would have led one to add such features to the system described in the Wuthrich article. Clearly, Roesler provides no such teachings or suggestions and the Examiner has pointed to no such teachings in the Wuthrich article, the Roesler article, or any other prior art reference. Withdrawal of the rejection as applied to claim 4 is solicited.

Claim 5

Claim 5 further recites the step of clustering templates containing information about different publicly traded companies into similar cluster groups, determining changes in stock price of the companies in the cluster group at different times in response to comparable information, and estimating the statistical probability of a change in the stock price of the publicly traded company being monitored in response to new information statistically correlated to the information in the comparable information. The Examiner has not even attempted to identify where such teachings may be found in the Wuthrich article or the Roesler article, and Applicant can find none. Withdrawal of the rejection as applied to claim 5 is solicited.

Claim 6

Claim 6 relates to further conducting a stock trade based on the predicted change in stock price. The Wuthrich article relates to predicting the direction of the stock market – not to predicting the direction of a particular stock and making a trade for that stock based on such information. The Roesler article does not relate to stock trading at all. The Examiner has not provided a reference to any teachings in either reference that would suggest the result of the information monitoring is to conduct a stock trade for a particular stock and Applicant can find no such teaching. Withdrawal of the rejection as applied to claim 6 is solicited.

Conclusion:

Each of claims 2-6 stands alone and is not taught by the teachings of the Wuthrich article alone or in any proposed combination with the Roesler article. The Examiner has failed to establish what the relevant teachings are in the articles and how they would have

suggested to or motivated one skilled in the art to combine such teachings to arrive at the claimed invention. Withdrawal of the rejection of claims 2-6 over the Wuthrich and Roesler articles and allowance of claims 2-6 are solicited.

8. CLAIMS APPENDIX

1. (Canceled)

2. (Previously Presented) A method of predicting stock market behavior using natural language processing, comprising:

extracting information from news media relating to a particular publicly traded company to create a template including natural language text describing activities or announcements of said particular publicly traded company;

relating changes in stock price of said particular publicly traded company to information stored in said template about said particular publicly traded company;

determining a statistical significance of said changes in stock price of said particular publicly traded company based on said information; and

predicting changes in price of the stock of said particular publicly traded company based on new information about said particular publicly traded company if information of the type included in the new information has in the past caused a statistically significant change in the stock price in said particular publicly traded company.

3. (Previously Presented) A method as in claim 2, further comprising clustering the information of said particular publicly traded company with information of another company whose stock price has been shown to be similarly affected by similar information as included in said new information.

4. (Previously Presented) A method as in claim 2, wherein said information extracting step comprises using natural language processing to parse sources of said information for information about said particular publicly traded company, standardizing different references to the particular publicly traded company by different proper names, co-referencing when the particular publicly traded company is referred to by pronouns, adding said new information to said template, and adding additional information about said particular publicly traded company to said template using databases and/or derived values.

5. (Previously Presented) A method as in claim 2, comprising the further steps of clustering templates containing information about different publicly traded companies into similar cluster groups, determining changes in stock price at different intervals for different companies in a cluster group in response to comparable information, and estimating the statistical probability of a change in the stock price of said particular publicly traded company in response to certain new information statistically correlated to that in said comparable information.

6. (Previously Presented) A method as in claim 2, comprising the further step of conducting a stock trade based on said predicted changes in stock price.

9. EVIDENCE APPENDIX

None.

10. RELATED PROCEEDINGS APPENDIX

None.

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